## REMARKS

Claims 1-27 are provisionally rejected under 35 U.S.C. § 101 as claiming the same invention as that of Claims 1-27 of co-pending application Serial No. 09/561,737. Claims 1-27 of this co-pending application have been canceled in an amendment mailed on the same date as this amendment in that application. Therefore, this rejection is believed to have been overcome.

In the pending claims, the words "including" and "includes" have been replaced respectively by "comprising" and "comprises." Since the terms "including" and "includes" have been interpreted by the courts to mean that other elements not mentioned in the claims are excluded, the amendments to these claims have the effect of broadening the claims rather than narrowing them. The amendments are not made for reasons related to the patentability of the amended claims.

Claims 1-45 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,166,714 to Kishimoto. The rejection is respectfully traversed.

In order for a reference to anticipate a claim, there must be identity of elements between the reference and the claim. Kishimoto fails this test for reasons explained below.

Not in claims

The rejected Claims 1-45 of this application are directed to passive LCDs. Thus, as clearly set forth in the preamble of these claims, the display for which the invention of the rejected claims is applicable comprises an array of elongated row and an array of elongated column electrodes arranged transverse to the row electrodes, where an overlapping area of the two arrays of electrodes define pixels of the display when viewed in the viewing direction. This is not true at all in Kishimoto. Kishimoto is directed to the active matrix type LCD where, the gate and source electrodes does not actually form the display pixel per-se, and

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

where the display comprises a common electrode and an isolated pixel electrode for each pixel. This is clearly spelled out in column 4, lines 22-67 of Kishimoto. Thus, the LCD of Kishimoto contains a matrix array of "e.g., 480 x 1,920 pixel electrodes 20 formed on the glass substrate SB1 ..." Column 4, lines 33, 34. This matrix array overlaps a common electrode 22 (column 4, line 51). In order to control the voltage across each individual pixel electrode 20 and the common electrode 22, 480 scanning lines Y1 to Y480 and 1,920 signal lines X1 to X1920 are employed, together with 480 x 1,920 thin film transistors 24, where each individual thin film transistor controls a corresponding pixel electrode 20. This is radically different from the display called for in the rejected claims where the pixels are defined by the overlapping areas of a row electrode and a common electrode and not by the overlapping area between an individual pixel electrode 20 and a common electrode 22 as called for in Kishimoto.

While the structure of the display is in the preamble of the rejected claims, such structure is integral with and cannot be separated from the operation of the elements of the claims. Thus, in Claim 1, the displaying of desired images of the display is caused by the circuit responsive to the at least two power sources and supplying electrical potentials to the row and column electrodes so as to control the voltage across an individual row electrode and each individual column electrode, in order to display a desired image at the overlapping areas between the row electrodes and the column electrodes that define the pixels. This is radically different from Kishimoto, where desired images are displayed by controlling each of the pixel electrodes 20 in the matrix array without changing the voltage of the common electrode 22. Similarly, the claim elements of the remaining claims other than Claim 1 are also integral with and cannot be separated from the above-described construction of the passive LCD.

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

It is submitted that the above differences between a passive LCD such as that addressed by the rejected claims and an active matrix LCD such as Kishimoto is a fundamental one and is well appreciated by those skilled in the art. The fundamental differences between passive LCDs and active matrix LCDs include the following:

1. The row and column electrodes in active matrix LCDs are typically made of metal and are not transparent. These electrodes are used in active matrix LCDs only for transmitting electrical signals and do not define the pixels. Pixels are defined by the overlapping areas between each individual pixel electrode and a common electrode, so that there must be the same number of pixel electrodes as the number of pixels. In contrast, the row and column electrodes of passive LCDs are typically transparent. This is because the overlapping areas between the two arrays of electrodes define the pixels and therefore must transmit light (except for certain passive LCDs operating in reflection mode, where one array of electrodes may reflect light). Different from active matrix LCDs, the electrodes that overlap to define pixels in passive LCDs are also used to transmit the addressing (scanning) and data electrical signals; unlike active matrix LCDs, no additional electrodes are employed to transmit the electrical signals.

2. In active matrix LCDs, the signal applied to each pixel (electrical potential between its pixel electrode and the common electrode) is controlled individually and separately from the signal applied to any other pixel by means of the TFT connecting X and Y electrical signals to its pixel electrode. This is not true at all in passive LCDs. In passive LCDs, the same addressing or scanning signal is applied to all pixels along the same row electrode to which the addressing or scanning signal is applied. In the same vein, the same data signal is applied to all pixels along the same column electrode to which the data signal is applied.

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

Due to fundamental differences above, what is applicable to active matrix LCDs is typically not applicable to passive LCDs and vice versa. Does not claim a passive LCD

In Claim 1, the circuits applying electrical potentials are such that at least one of the electrical potential supplied to the row and column electrodes floats with a voltage supplied or caused to be supplied by one of the power sources. The Examiner is of the opinion that Kishimoto teaches this aspect of the invention. The Examiner points to the description in Kishimoto that, as the scanning pulse falls, all of the TFTs 24 connected to the scanning line Y1 are turned off, thereby causing the pixel electrodes 20 of the first row to be electrically disconnected from the signal lines, i.e., set in a floating state. Column 7, lines 34-38, Fig. 7 at 20. See bottom of page 3 of the office action. The Examiner also points to Kishimoto in the second horizontal scanning period for the first frame period that the pixel electrode is in the floating state. Column 7, lines 41-48, Fig. 7 at 20. See top of page 4 of the office action. The Examiner's reliance on such sections of Kishimoto is misplaced.

The floating state referred to by Kishimoto is the floating state of pixel electrodes 20, not of the floating state of an electrical potential supplied to the row or column electrodes that is called for by Claim 1. This difference is illustrated clearly in one embodiment of the invention in reference to Fig. 3d. In reference to this figure, when the switching signal F1a causes switches I5, I7, I9 and I12 to be turned on, the capacitor C0 is charged to a voltage equal to the voltage difference between VCOM+ and VB+. The voltages at the two plates of the capacitor may then be used to drive the node COM which is connected directly to one of the row electrodes. In a different addressing cycle, the switching signal F1a is turned off and the other switching signal F2a is turned on, thereby turning on switches I6, I8 and I13. Since the top plate of capacitor C0 is now connected to voltage supply VB-, this means that the bottom plate of the capacitor will be pushed down to a value below VB- by the voltage

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

difference between VCOM+ and VB+, while this bottom plate is not connected to any power source and is therefore at a floating potential. Such floating potential at the bottom plate of capacitor C0 is then used at some time intervals to supply an electrical potential to the node COM directly connected to one of the row electrodes, such as the ith row electrode COMi. As is evident from Fig. 3d, such potential is then applied to the ith row electrode COMi overlapping at the ijth pixel with the jth column electrode SEGj.

Since the floating potential in the invention of rejected claims is applied to row or column electrodes, this causes the electrical potential of these electrodes to also float. In contrast, the electrical potentials of the X (column) and Y (row) electrodes of Kishimoto (and the electrical potentials applied by the circuit to these electrodes) do not float at any time. The floating of the pixel electrodes in Kishimoto is caused by the turning off of the TFT connecting it to the Y scanning line so that the electrical potential of the Y scanning line is cut off from the pixel electrode. The floating of the pixel electrodes is radically different from and has nothing to do with the floating of the electrical potential applied to the row or column electrodes.

For the reasons above, it is believed that there is no identity of elements between Kishimoto and Claim 1.

Furthermore, in view of the vast differences between Kishimoto and the above-described features of Claim 1 as well as the differences overall between passive LCDs and active matrix LCDs, it is believed that there is no reason or motivation to modify Kishimoto to arrive at a structure such as that of Claim 1. Claim 1 is therefore believed to be allowable.

In regard to Claim 14, again the second voltage range that floats with the first voltage range pertains to a voltage range driven by the one or more power sources; it does not refer to

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

the voltage range of the pixel electrode 20 of Kishimoto. Therefore, for substantially the same reasons as those explained above for Claim 1, Claim 14 is also believed to be allowable over Kishimoto.

The Examiner has apparently not given any reasons pertaining to the inventive feature of Claim 23, which is therefore believed to be allowable. If the rejection of Claim 23 is to be maintained, it is respectfully requested that the Examiner set forth in detail the reasons why Kishimoto anticipates this claim. Moreover, the next action in rejecting this claim should not be a final action, since the examiner has failed to present a prima facie case of anticipation with respect to this claim.

In regard to dependent Claims 12, 13, 15-17 and 19-21, Kishimoto clearly fails to teach or suggest the use of energy storage devices such as capacitors for supplying electrical potentials to the LCD. The capacitances relied on by the Examiner in the Office Action in presumably rejecting claims 12, 13, 16 and 17 refer to the inherent capacitances between the pixel electrodes 20 and the common electrode 22 of Kishimoto, not to any energy storage device (which may have substantially higher capacity than the entire display capacitance loading, as indicated in one embodiment) used to supply electrical potentials to these pixel electrodes and the common electrode. If the Examiner disagrees, it is respectfully requested that the Examiner explain in detail why this is not the case. In regard to Claims 15 and 16, as noted above, the floating of the voltage range refers to the floating of electrical potentials supplied to electrodes, and not to the voltage state of the electrodes themselves. In regard to Claims 19 and 20, for reasons given above, Kishimoto fails to teach or suggest the use of capacitors that are charged in a first phase of the operation sequence in order to supply electrical potentials to the row or column electrodes in a second phase of operation sequence.

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

For substantially the same reasons as those explained above, it is believed that Claims 25-27 are not taught or suggested by Kishimoto. For substantially the same reasons as those explained above regarding claims 12, 13, 16 and 17, Claims 36 and 37 are not taught or suggested by Kishimoto. In regard to Claim 37, Kishimoto has clearly failed to teach that the power supply comprises a voltage regulator, a comparator and a current source.

Capacitors

Regarding Claims 2-5, 9-10, 24, 35, 39 and 45 again Kishimoto has failed to teach or suggest the use of any energy storage devices such as capacitors to supply electrical potentials to the row or column electrodes, and the multiple phase operation principle involved in utilizing the energy storage device as the source for driving the display.

Regarding Claims 6, 7, 9, 11, 18, 22 and 38, they are believed to be allowable since they depend from allowable claims and on the ground of the features added therein. Thus, Kishimoto fails to teach or suggest the capacitor of Claim 22. Similarly, Kishimoto fails to teach or suggest connecting to the energy storage device of Claims 28 and 29. Similarly, Kishimoto fails to teach or suggest the method of Claim 35 involving the first and second energy storage devices. Similarly, Kishimoto fails to teach or suggest the features of Claims 39 and 40 involving two energy storage devices. Kishimoto certainly has failed to teach or suggest the timing waveform delaying feature of Claim 40.

Regarding Claims 30-34 and 40-44, the variation in electrical potential of the pixel electrode relied on by the examiner has nothing to do with the scheme in Claims 30-34 where two energy storage devices are used alternately to supply electrical potentials to at least one column electrode according to a waveform that is delayed relative to row scanning cycles. Thus, Claim 31 is directed to the feature that a major portion of the energy of the first energy storage device is transferred to the at least one column electrode during the beginning portion of the row scanning cycle to drive the voltage of the electrode to close to a target value, and

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

the second energy storage device is used to further charge such column electrode to substantially the target value. This is not taught or suggested by Kishimoto. The same is true for Claims 32 and 33. For substantially the same reasons as those for Claims 30-33, Kishimoto also does not teach or suggest the features of Claims 40-44.

Claims 1-45 are presently pending in the application. Reconsideration of the rejections is respectfully requested, and an early indication of the allowability of all the claims is earnestly solicited.

EXPRESS MAIL LABEL NO:

EV029355504US

Respectfully submitted,

James S. Hsue
Attorney for Applicant(s)
Reg. No. 29,545

LAW OFFICES OF
SKJERVEN MORRILL
LLP
3 EMBARCADERO
CENTER
SUITE 2800
SAN FRANCISCO, CA
94111
(415) 217-6000
FAX (415) 434-0646

**Version with markings to show changes made**

1. An apparatus for driving a liquid crystal display, said display comprising an array of elongated row and an array of elongated column electrodes arranged transverse to the row electrodes, wherein overlapping areas of the two arrays of electrodes define pixels of the display when viewed in a viewing direction, said apparatus comprising:

at least two separate power sources; and

a circuit responsive to the at least two power sources and supplying electrical potentials to the row and column electrodes, to cause the display to display desired images, wherein at least one of the electrical potentials supplied to the row and column electrodes floats with a voltage supplied or caused to be supplied by one of the power sources.

2. (Amended) The apparatus of claim 1, the circuit ~~including~~comprising a control device and at least one energy storage device to supply said at least one of the electrical potentials, wherein the control device causes the at least one energy storage device to be charged in a first phase, and connects said at least one energy storage device to the voltage supplied or caused to be supplied by said one of the power sources and to the row or column electrodes in a later second phase, so that said at least one of the electrical potentials supplied by said at least one energy storage device to the row or column electrodes floats with said voltage.

3. The apparatus of claim 2, wherein at least one energy storage device has at least two terminals, wherein the control device causes one terminal to be connected to the voltage and another terminal to be connected to the row and column electrodes, wherein said another terminal supplies said at least one of the electrical potentials that floats with the voltage.

4. (Amended) The apparatus of claim 2, the at least one energy storage device ~~including~~comprising one or more capacitors.

5. The apparatus of claim 2, wherein the control device also causes the at least one energy storage device to supply electrical potentials to the row or column electrodes during the first phase.

6. The apparatus of claim 2, said at least two power sources supplying respectively a first and a second voltage and a common reference voltage, the difference between the second and the reference voltages defining a voltage differential, said control device comprising a first set of switches that causes a set of voltages to be generated that are above the reference voltage or below the first voltage by an integer multiple of the voltage differential.

7. The apparatus of claim 6, said control device further comprising a second set of switches that connect said set of voltages at selected times to the row and column electrodes so that the electrodes are driven by an IAPT driving method.

8. The apparatus of claim 6, wherein some of the voltages in the set of voltages float with the reference voltage during some field addressing cycles and other voltages in the set of voltages float with the first voltage during other field addressing cycles.

9. (Amended) The apparatus of claim 2, said circuit ~~including~~comprising two energy storage devices each having two terminals, wherein the control device causes the two energy storage devices to be connected in parallel to the power sources during the first phase to charge the energy storage devices, so that they are charged to substantially the same voltage across their terminals.

10. (Amended) The apparatus of claim 2, said circuit ~~including~~comprising two energy storage devices each having two terminals, wherein the control device causes the two energy storage devices to be connected in series to the power source during the first phase to charge the energy storage devices.

11. The apparatus of claim 2 wherein the electrical potentials supplied by the circuit to the row electrodes are of a predetermined amplitude above a reference voltage in some field addressing cycles and of the predetermined amplitude below the reference voltage in other field addressing cycles, wherein the electrical potentials supplied by the circuit have a dynamic range substantially equal to said amplitude.

12. (Amended) The apparatus of claim 1, said circuit ~~including~~comprising two energy storage devices, wherein the devices are charged by one of the power sources during a portion of at least one field addressing cycle and used to supply electrical potentials to a row or column electrode in a different portion of such field addressing cycle, wherein the devices are charged for a fraction of such different portion to compensate for charge consumption.

13. The apparatus of claim 1, said apparatus being an integrated circuit having a substrate, wherein the first and second power sources supply only electrical potentials that are higher or lower than a reference potential of the substrate.

14. An apparatus for driving a liquid crystal display, said display comprising an array of elongated row and an array of elongated column electrodes arranged transverse to the row electrodes, wherein overlapping areas of the two arrays of electrodes define pixels of the display when viewed in a viewing direction, said apparatus comprising:

at least two separate power sources;

wherein one or more of the power sources drives the row electrodes through a first voltage range, and drives the column electrodes through a second voltage range, wherein the first voltage range changes over different field addressing cycles, and the second voltage range floats with the first voltage range when the first voltage range changes and with at least the voltage generated or caused to be generated by one of the power sources.

15. The apparatus of claim 14, wherein the first voltage range is between a non-scanning voltage value and a scanning voltage value, and wherein the second voltage range floats with the non-scanning voltage value.

16. (Amended) The apparatus of claim 15, wherein the first power source ~~includes~~comprises a first power supply, wherein the second power source ~~includes~~comprises a pair of capacitors, said apparatus further comprising a switching circuit connecting the first power supply and the capacitors to cause the second voltage range to float about the non-scanning voltage value.

17. The apparatus of claim 16, wherein the pair of capacitors are connected in a voltage divider configuration separating three nodes, wherein the switching circuit causes one of the nodes in between the pair to be at the non-scanning voltage of the first voltage range in at least one field addressing cycle.

18. The apparatus of claim 17, wherein the switching circuit causes voltages at one of the two remaining nodes to be supplied to a connections to a column electrode during at least one field addressing cycle.

19. The apparatus of claim 15, wherein the capacitors are charged by the first or second power source during a portion of at least one field addressing cycle and used to supply electrical potentials to a row or column electrode in a different portion of such field addressing cycle, wherein the capacitors are charged for a fraction of such different portion to compensate for charge consumption.

20. The apparatus of claim 19, wherein the column electrodes are driven by column drivers, and wherein the column electrodes are substantially disconnected from column drivers during said fraction of such different portion to preserve column signals that have been applied to the column electrodes.

21. The apparatus of claim 14, said apparatus being an integrated circuit having a substrate, wherein the first and second power sources supply only electrical potentials that are higher or lower than a reference potential of the substrate.

22. (Amended) The apparatus of claim 14, one of the power sources ~~including~~comprising at least one power supply and a capacitor, said capacitor connected to a connection node for each of the column electrodes and storing charges from a column electrode during one column addressing cycle, said second power source further ~~including~~comprising a switching circuit that cause said stored charges to be applied to said column electrode in a subsequent column addressing cycle.

23. An apparatus for driving a liquid crystal display, said display comprising an array of elongated row and an array of elongated column electrodes arranged transverse to the row electrodes, wherein overlapping areas of the two arrays of electrodes define pixels of the display when viewed in a viewing direction, said apparatus comprising:

at least two separate power sources; and

a circuit responsive to the at least two power sources and supplying electrical potentials to the row and column electrodes, to cause the display to display desired images;

wherein the electrical potentials supplied by the circuit to the row electrodes are of a predetermined amplitude above a reference voltage in some field addressing cycles and of the predetermined amplitude below the reference voltage in other field addressing cycles, wherein the electrical potentials supplied by the circuit have a dynamic range substantially equal to said amplitude.

24. (Amended) The apparatus of claim 23, said at least two power sources supplying a reference voltage and a voltage above or below the reference voltage of an amplitude suitable for driving the row electrodes, said circuit ~~including~~comprising a capacitor and a selection circuit selectively connecting the at least two power sources and the capacitor to each of the row electrodes, so that positive going pulses of said amplitude in reference to the reference voltage are applied in some field addressing cycles to the

row electrodes and negative going pulses of said amplitude in reference to the reference voltage are applied to the row electrodes in other field addressing cycles for the row electrodes.

25. A method for driving a liquid crystal display, said display comprising an array of elongated row and an array of elongated column electrodes arranged transverse to the row electrodes, wherein overlapping areas of the two arrays of electrodes define pixels of the display when viewed in a viewing direction, said method comprising

supplying electrical potentials to the row and column electrodes, to cause the display to display desired images;

wherein said supplying ~~includes~~comprises charging and discharging at least one energy storage device to supply said at least one of the electrical potentials.

26. (Amended) The method of claim 25, wherein at least one of the electrical potentials supplied to the row or column electrodes floats with a voltage supplied by a power source, wherein said supplying ~~includes~~comprises charging the at least one energy storage device in a first phase, and connects said at least one energy storage device to the row or column electrodes in a later second phase, so that said at least one of the electrical potentials supplied by said at least one energy storage device to the row or column electrodes floats with said voltage.

27. The method of claim 26, wherein said at least one energy storage device has at least two terminals, wherein the supplying causes one terminal to be connected to the voltage and another terminal to be connected to the row and column electrodes, and causes said another terminal to supply said at least one of the electrical potentials that floats with the voltage.

28. The method of claim 25, wherein said supplying comprises connecting an energy storage device alternately to a power supply and at least one column electrode.

29. The method of claim 28, said supplying comprising connecting the power supply and the at least one column electrode to a first and a second electrical energy storage device in alternate row scanning cycles.

30. The method of claim 29, wherein said supplying connects the power supply and the at least one column electrode to the two energy storage devices according to a switching timing waveform that is delayed relative to said row scanning cycles, so that at least one of the energy storage devices is connected to the at least one column electrode during a portion of a row scanning cycle, and the remaining energy storage device is connected to the at least one column electrode during another portion of such row scanning cycle.

31. The method of claim 30, wherein said time delay is such that a major portion of the energy of the first energy storage device is transferred to the at least one column electrode during a beginning portion of such row scanning cycle, thereby driving the voltage of said at least one column electrode to close to a target value, and a minor portion of the energy of the second energy storage device is transferred to the at least one column electrode during but after the beginning portion of such row scanning cycle, thereby driving the voltage of said at least one column electrode to substantially the target value.

32. The method of claim 30, wherein said switching timing waveform is such that during a portion of such row scanning cycle, both the first and the second energy storage devices are connected to the at least one column electrode.

33. The method of claim 29, wherein the first energy storage drives the voltage of said at least one column electrode to close to a target value during a beginning portion of a row scanning cycle, and the second energy storage device drives the voltage of said at least one column electrode to substantially the target value during but after the beginning portion of such row scanning cycle.

34. The method of claim 33, wherein a major portion of the energy of the first energy storage device is transferred to the at least one column electrode during a beginning portion of a row scanning cycle, thereby driving the voltage of said at least one column electrode to close to a target value, and a minor portion of the energy of the second energy storage device is transferred to the at least one column electrode during but after the beginning portion of such row scanning cycle, thereby driving the voltage of said at least one column electrode to substantially the target value.

35 The method of claim 29, wherein during a portion of a row scanning cycle, both the first and the second energy storage devices are connected to the at least one column electrode.

36. An apparatus for driving a liquid crystal display, said display comprising an array of elongated row and an array of elongated column electrodes arranged transverse to the row column electrodes, wherein overlapping areas of the two arrays of column electrodes define pixels of the display when viewed in a viewing direction, said apparatus comprising:

a power supply;

at least one electrical energy storage device; and

a switching circuit connecting the power supply to the device to charge the device and connecting the device to at least one of the column electrodes to supply electrical potential(s) thereto, wherein the display displays desired images.

37. (Amended) The apparatus of claim 36, wherein said power supply ~~includes~~comprises a voltage regulator, a comparator and a current source.

38. The apparatus of claim 36, wherein said circuit connects the device alternately to the power supply and the at least one column electrode.

39. The apparatus of claim 36, said apparatus comprising a first and a second electrical energy storage device, wherein said circuit connects the power supply and the

at least one column electrode to the two energy storage devices in alternate row scanning cycles.

40. The apparatus of claim 39, wherein said circuit connects the power supply and the at least one column electrode to the two energy storage devices according to a switching timing waveform that is delayed relative to said row scanning cycles, so that at least one of the energy storage devices is connected to the at least one column electrode during a portion of a row scanning cycle, and the remaining energy storage device is connected to the at least one column electrode during another portion of such row scanning cycle.

41. The apparatus of claim 40, wherein said time delay is such that a major portion of the energy of the first energy storage device is transferred to the at least one column electrode during a beginning portion of such row scanning cycle, thereby driving the voltage of said at least one column electrode to close to a target value, and a minor portion of the energy of the second energy storage device is transferred to the at least one column electrode during but after the beginning portion of such row scanning cycle, thereby driving the voltage of said at least one column electrode to substantially the target value.

42. The apparatus of claim 40, wherein said switching timing waveform is such that during a portion of such row scanning cycle, both the first and the second energy storage devices are connected to the at least one column electrode.

43. The apparatus of claim 39, wherein the first energy storage drives the voltage of said at least one column electrode to close to a target value during a beginning portion of a row scanning cycle, and the second energy storage device drives the voltage of said at least one column electrode to substantially the target value during but after the beginning portion of such row scanning cycle.

44. The apparatus of claim 43, wherein a major portion of the energy of the first energy storage device is transferred to the at least one column electrode during a beginning portion of a row scanning cycle, thereby driving the voltage of said at least one column electrode to close to a target value, and a minor portion of the energy of the second energy storage device is transferred to the at least one column electrode during but after the beginning portion of such row scanning cycle, thereby driving the voltage of said at least one column electrode to substantially the target value.

45. The apparatus of claim 39, wherein during a portion of a row scanning cycle, both the first and the second energy storage devices are connected to the at least one column electrode.